

Using Document Classes and Packages

Preamble and Document Structure

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Abstract

This module will discuss how to create your first document. You will become more proficient with the software during the process. This module will provide an overview of document classes and packages to enable you to use them. In addition, it will introduce document structure and front matter. It will discuss some formatting basics too.

1 Getting Started

This handout will discuss how to create your first document. You will become more proficient with the software during the process. This handout will provide an overview of document classes and packages to enable you to use them. In addition, it will introduce document structure and front matter. It will discuss some formatting basics too.

1.1 Some Basics

Before we construct our first document, let's talk about some basics. In addition to the content of \LaTeX articles, markup commands are entered to achieve the desired typesetting. These markup commands will be referred to as commands, environments, and declarations. All commands, environments, and declarations are case sensitive.

1.2 Markup Commands

Commands begin with a backslash character (`\`). The remainder of the command consists of characters, where the first space or non-character ends the command. An example of a markup command is `\maketitle`. Not all phrases that begin with a backslash are commands. A backslash is also used when printing special characters, such as `\%`. If the backslash was not used, the remainder of the line would be treated as a comment by \LaTeX because a comment line begins with `%`. Sometimes there are special instances of a command, which is indicated by *command**. An author can create their own commands as well.

1.3 Environments

An environment will be marked by the following, `\begin{environment} ... \end{environment}`, and will only affect the text contained therein. An example of an environment that will be discussed in this module is *document*. In addition, users can create their own environments. Sometimes there are special instances of an environment too (i.e. `\begin{environment name*}`).

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1.4 Declarations

We will discuss declarations more in the next module. We will discuss declarations pertaining to margins and line spacing in this module. These declarations use the `setlength` command (i.e. `\setlength{\parskip}{0.1in}`). They will be placed in the preamble, so they are true for the entire document.

1.5 Paragraphs and Spaces

Paragraphs are separated by a blank line. A sequence of several spaces is treated as one space. Additional horizontal and vertical space can be added by using `\hspace{distance}` and `\vspace{distance}`. Spacing for paragraph indents are controlled by `\parindent`. More information about spacing will be discussed in the next module.

2 Create a Document

Generally, the first markup command in a latex document indicates the document class. This command, as well as other particular commands, are specified before the beginning of the document, `\begin{document}`. The space before the beginning of the document is called the “preamble” (Mittelbach, Goossens, Braams, Carlisle, & Rowley, 2004). Packages are declared in the preamble as well.¹

2.1 Document Classes

There are five base classes included with \LaTeX : *article*, *book*, *report*, *slides*, and *letter*. Publisher provided classes will be discussed in a later module. They contain unique commands and environments that are supplied by the class. The markup command designating the document class is

```
\documentclass[options]{class name}
```

Class files contain global processing information for the document (Kopka & Daly, 2004). They set the format of the title, sections, and other elements in the document. There are usually packages that you can use or you can write code in order to override some of the formatting.

We will use `article.cls` during this workshop. It is often the basis for other class files. If you get to know it, it will be easier to get to know other class files.

2.2 Packages

They extend the basic \LaTeX commands. There are standard packages that are included with every \LaTeX implementation and there are contributed packages submitted by \LaTeX users (Kopka & Daly, 2004). To use packages, include the following markup command.

```
\usepackage[options]{package name}
```

The options declared in the document class are global, so any option set in the document class file will apply to all packages. Options used with the packages apply to the packages only (Kopka & Daly, 2004).

2.2.1 Ugh. I have an error, unknown control sequence

When generating a \LaTeX document, the error, unknown control sequence, often indicates that a package is needed.

¹Document Classes and Packages must be installed to use them. For more information on locating and installing packages, please go to Workshop 1, [Finding and Installing \$\LaTeX\$](#) .

2.3 article.cls

This class file comes standard with LaTeX, so you won't need to install it. It will already be ready for you to use in your LaTeX document.

2.3.1 Optional arguments

There are several optional arguments that you can use with `article.cls`. If you do not specify any, it will use the defaults: *10pt*, *letterpaper*, *onecolumn*, *oneside*, *notitlepage*, and *final*.

Since `article.cls` comes standard with LaTeX, you can find out what options are available from nearly any \LaTeX documentation and the meaning of most options are intuitive. I will only discuss a few of them here. Regarding font size, you have a choice between *10pt*, *11pt*, and *12pt*. The options *oneside* versus *twoside* aren't as obvious as the others. It sounds like it would print double sided by just using it; however, it formats the document with the intention of printing two sided.

Using the *twoside* or *oneside* option is particularly important when you are using running headings. The page number will print alternating from right to left on the pages. You can use the `markboth` command to place text on the opposite side of the page number. The `markboth` command only works as intended when *twoside* is used. For *oneside*, you would need to use the `markright` command.

2.4 Document Example

This is a simple document example to show you the general structure of a document using `article.cls`.

```
\documentclass[twoside]{article}
\usepackage{graphicx}
\usepackage{hyperref}

\title{Using Document Classes and Packages}
\author{T.~Stitz \and J.~Doe \and A.~Smith}

... more preamble commands

\begin{document}
  \maketitle

  \section{First Level}
  \subsection{Second Level}
  \subsubsection{Third Level}
  \section{Another First Level}
  ...
\end{document}
```

Title, author, and date can be placed in the preamble or the *document* environment. It is a matter of style. The `maketitle` command **must** be in the *document* environment.

In the example above, *twoside* was declared explicitly, so the document will be typeset with the intention of printing the document two sided.

In addition to the structure provided in the example, an article might contain an abstract, a reference section and an appendix within the *document* environment.

2.4.1 Formatting Parameters and Markup Commands

Many of the markup commands used to format the document are set by a class file. If the user is satisfied with the default formatting, no parameters would need set. Some of the parameters that might need set when using `article.cls` are introduced in this section. This is by no means an exhaustive list, but it will give the reader an idea of some of the settings.

Several parameters control page layout. A page consists of a head, foot, and body. Any of the parameters can be set using `\setlength{parameter}{value and units}`. Often, they are set in the preamble so they apply to the entire document.

Page Parameters

Parameter	Definition
<code>\topmargin</code>	from 1 in. margin to top of head
<code>\headheight</code>	height of head
<code>\headsep</code>	from bottom of head to top of body
<code>\topskip</code>	top margin within body
<code>\oddsidemargin</code>	from 1 in. margin to body
<code>\evensidemargin</code>	from 1 in. margin to body
<code>\footskip</code>	from bottom of body to bottom of foot
<code>\textwidth</code>	width of body text
<code>\textheight</code>	height of body text

Use of the *geometry* package alleviates some of the burden of setting all of these variables.

```
\usepackage[margin=1in]{geometry}
```

The command above is **much** easier to use than using the `setlength` command to set all the parameters. In addition to the increased typing, one would need to do many calculations.

There are also paragraph formatting commands, such as spaces between paragraphs; amount of indentation; and line spacing. The *setlength* command can be used for the first two parameters, but the *renewcommand* must be used for line spacing.

```
%Make the space between paragraphs one half line space
\setlength{\parskip}{0.5\baselineskip}
```

```
%Make the paragraph indent the width of 2 capital M.
\setlength{\parindent}{2em}
```

```
%Double spacing
\renewcommand{\baselinestretch}{2}
```

3 Entering Front Matter

For this workshop, we will consider the front matter to pertain to content displayed before the body of the article. This nearly always is the title and author. It can be the abstract too. The article class keeps the abstract separate from the body of the article by default. Depending on how the author command argument is written, it could add more content to the front matter.

3.1 Entering Titles

Entering a title is very straightforward and does not change much from class file to class file.

```
\title{The effect of fluorosurfactant, copolymer latex, and cross-linker on the surface properties of floor polishes: An investigation using AFM with adhesion mapping}
```

As stated previously, you can put this command in the preamble or the document. Your choice.

3.2 Entering Authors

There are several ways that you can enter authors. The basic structure to enter authors with their affiliations is as follows.

```
\author{%
Rebecca~L.~Agapov%
\thanks{The University of Akron, Department of Polymer Science, Akron, OH 44325-3909, United States} \and%
James~Robbins\thanks{OMNOVA Solutions, 2990 Gilchrist Road, Akron, OH 44305-4418, United States} \and%
Richard~Thomas\footnotemark[2] \and%
Dave~L.~Hardman\footnotemark[2] \and%
Mark~D.~Foster\footnotemark[1] $^,$%
\thanks{Corresponding author. Tel.: +1 330 972 5323; fax: +1 330 972 5290. %
E-mail address: mdf1@uakron.edu (M.D. Foster).}%
}
```

I used the percent signs (%) to break up the command on multiple lines, so it is easier to read. If you took them out, the required argument could not contain any line breaks.

The tilde () doesn't allow a line break, so it forces the firstname, middle initial, and lastname to stay together. The *thanks* command is a footnote associated with the author. The *thanks* could be used in the *title* command if you needed a footnote there as well.

Whatever you type in the curly bracket will appear in the footnotes exactly as you typed it. The title and author will appear as long as you use the *maketitle* command. The *footnotemark* command will be discussed in the next module, but it is used here because one affiliation applies to more than one author.

3.2.1 Document Appearance

The output will be similar to the following.

The effect of fluorosurfactant, copolymer latex, and cross-linker
on the surface properties of floor polishes: An investigation using
AFM with adhesion mapping

Rebecca L. Agapov* James Robbins† Richard Thomas†
Dave L. Hardman† Mark D. Foster* ‡

I put the affiliations in the footnotes for this example:

*The University of Akron, Department of Polymer Science, Akron, OH 44325-3909, United States

†OMNOVA Solutions, 2990 Gilchrist Road, Akron, OH 44305-4418, United States

‡Corresponding author. Tel.: +1 330 972 5323; fax: +1 330 972 5290. E-mail address: mdf1@uakron.edu (M.D. Foster).

3.2.2 Alternate Formats for Authors

Authors Displayed as a Single String

The author command could be written such that the authors have commas between them instead of a tab as follows.

```
\author{Rebecca~L.~Agapov\thanks{The University of Akron, Department of Polymer Science, Akron, OH 44325–3909, United States}, James~Robbins\thanks{OMNOVA Solutions, 2990 Gilchrist Road, Akron, OH 44305–4418, United States}, Richard~Thomas\footnotemark[2],\ Dave~L.~Hardman\footnotemark[2], and Mark~D.~Foster\footnotemark[1] $^,$\thanks{Corresponding author. Tel.: +1 330 972 5323; fax: +1 330 972 5290. E–mail address: mdf1@uakron.edu (M.D. Foster).}}
```

Notice that the command was replaced by a comma, as well as the word and before the last author.

Document Appearance

Only the author formatting has changed.

The effect of fluorosurfactant, copolymer latex, and cross-linker
on the surface properties of floor polishes: An investigation using
AFM with adhesion mapping

Rebecca L. Agapov^{*}, James Robbins[†], Richard Thomas[†]
Dave L. Hardman[†], and Mark D. Foster^{* †‡}

Footnotes:

^{*}The University of Akron, Department of Polymer Science, Akron, OH 44325-3909, United States
[†]OMNOVA Solutions, 2990 Gilchrist Road, Akron, OH 44305-4418, United States
[‡]Corresponding author. Tel.: +1 330 972 5323; fax: +1 330 972 5290. E-mail address: mdf1@uakron.edu (M.D. Foster).

Sometimes, you want the affiliations with the authors instead of in the footnotes as in this example.

Affiliations with the Authors

You can include any portion of the affiliations in the author command directly instead of using the thanks command. In this example, we place the institution and the address under the appropriate author names.

```
\author{Rebecca~L.~Agapov and Mark~D.~Foster\thanks{Corresponding author. Tel.: +1 330 972 5323; fax: +1 330 972 5290. E–mail address: mdf1@uakron.edu (M.D. Foster).}\ The University of Akron\ Department of Polymer Science\ Akron, OH 44325–3909\ United States\ vspace{1.5em} \ James~Robbins, Richard~Thomas, and Dave~L.~Hardman\ OMNOVA Solutions\ 2990 Gilchrist Road\ Akron, OH 44305–4418\ United States}
```

Document Appearance

Authors and affiliation information would appear similar to the following.

The effect of fluorosurfactant, copolymer latex, and cross-linker on the surface properties of floor polishes: An investigation using AFM with adhesion mapping

Rebecca L. Agapov and Mark D. Foster[‡]
 The University of Akron
 Department of Polymer Science
 Akron, OH 44325-3909
 United States

James Robbins, Richard Thomas, and Dave L. Hardman
 OMNOVA Solutions
 2990 Gilchrist Road
 Akron, OH 44305-4418
 United States

Footnotes:

[‡]Corresponding author. Tel.: +1 330 972 5323; fax: +1 330 972 5290. E-mail address: mdf1@uakron.edu (M.D. Foster).

There are many other looks that you can achieve. When we discuss publisher class files in a future module, we will utilize commands that come with the class file to achieve the look for their publication.

4 Entering the Abstract

The abstract is usually entered in the same manner regardless of class file. It is placed in the abstract environment. The class file will determine how it is formatted.

\maketitle

\begin{abstract}

The performances of three fluorosurfactants of different perfluoroalkyl chain lengths in styrene–butadiene (SB) and styrene–acrylic (SA) latex formulations having different virtual cross–linkers were investigated with atomic force microscopy (AFM). Topographic mapping provided no conclusive relationship with macroscopic observations of floor polish performance (with “performance” being judged by absence of haze and uniformity of flow and leveling.) Adhesion

...

\end{abstract}

Abstract from (Agapov, Robbins, Thomas, Hardman, & Foster, 2013).

5 Conclusion

To create a document, you must choose a document class file. It will provide formatting, so you can mostly concentrate on your content. Packages enable you to add information to your document easier, since you can use the commands that they provide instead of entering much more code to achieve the same effect. Sometimes a package can provide functionality that would not be otherwise available.

References

- Agapov, R. L., Robbins, J., Thomas, R., Hardman, D. L., & Foster, M. D. (2013). The effect of fluorosurfactant, copolymer latex, and cross-linker on the surface properties of floor polishes: An investigation using {AFM} with adhesion mapping. *Progress in Organic Coatings*, 76(9), 1279 - 1287. Retrieved from <http://www.sciencedirect.com/science/article/pii/S0300944013000829> doi: <http://dx.doi.org/10.1016/j.porgcoat.2013.03.020>
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